

Mollusca of the Kermadec Islands

PART I.

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ABSTRACT.

The material upon which this paper is based was dredged by the Royal Danish Research Ship *Galathea* in shallow water, 58-85 metres off Raoul or Sunday Island, Kermadecs, on March 3rd, 1952.

The paper contains descriptions of two new genera, a new subgenus, fourteen new species, two new subspecies, records of four described species new to the fauna and three revised identifications of previous records.

The Kermadecs are subtropical, marginal only to the Indo-Pacific Region and their molluscan fauna is a mixture of Indo-Pacific, East Australian, Norfolk Island and New Zealand elements. The present paper increases the Indo-Pacific and East Australian percentages.

Nanism is apparent in several pelecypod species which normally reach much greater size in the warmer waters of the Indo-Pacific proper.

The Kermadec Islands are situated in latitude 29° 15' south and longitude 177° 59' west, about midway between New Zealand and the Tongan Group.

The last major work on the Kermadec mollusca was a comprehensive paper by the late Dr. W. R. B. Oliver, "The Mollusca of the Kermadec Islands," which appeared in 1915 in the Transactions of the New Zealand Institute, volume 47.

Oliver's paper was based upon material collected during an expedition to the Islands in 1908 augmented by two collections formed by Mr. R. S. Bell during 1909 and 1910 respectively, one of which is in the Auckland Museum.

The present paper is based upon dredgings by the "Galathea" Expedition off Raoul Islands in 58-85 metres on a coarse shell-sand and gravel bottom and it was found to be rich in both new species and records new to the fauna.

In subsequent parts the remainder of the "Galathea" material will be described, followed by a check-list of the Kermadec molluscan fauna incorporating results of shore collecting by Mr. J. H. Sorensen during 1944.

The most spectacular shells from the "Galathea" dredgings are a handsome member of the tropical Cassid genus *Oniscidia*, a sculptured *Conus* representing a new subgenus, an elaborately sculptured new genus of the *Sanguinolariidae* and three new members of the *Pectinidae*. Two pelecypods, *Nemocardium* (*Pratulium*) *probatum* Iredale and *Pitarina* cf. *affinis* (Gmelin) are abundant in the "Galathea" dredgings, but they attain less than half the size reached by these species in warmer waters of the Pacific. They indicate dwarf races induced by less favourable conditions.

Another probable instance of nanism is shown by an abundant small pelecypod, *Asaphis nana* n. sp. which is the most temperate occurrence of this otherwise tropical genus so far known.

A surprise addition to the fauna is *Hawaiiarca alia* Dall, Bartsch and Rehder, known previously only from the Hawaiian Islands.

I am indebted to Dr. Anton F. Bruun, leader of the Galathea Expedition, who established the Kermadec shallow water stations at my request.

The types of the new species described in this paper are, unless otherwise stated, in the Zoological Museum, Copenhagen, Denmark.

Family ARCIDAE

Genus HAWAIARCA Dall, Bartsch & Rehder, 1938.

Type (o.d.): *Hawaiiarca rectangula* D. B. & R.

Hawaiiarca alia Dall, Bartsch & Rehder, 1938.

1938—*Hawaiiarca alia* Dall, Bartsch & Rehder, Bishop Museum Bulletin No. 153, p. 28, Pl. III, Figs. 7-10.

Type Locality: Northeast coast of Hawaii, 26-50 fathoms. Galathea St. 674, 29° 15' S., 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

This is a small, solid, inflated ovate-quadrate white Arcid with numerous relatively strong radial ribs beaded by almost equally strong concentric ribs. The radials number 46 in the Hawaiian holotype, which is 5 mm. in length but increase by intercolation to about 82 in a Kermadec shell of a length of 10.7 mm. The hinge is narrow, toothed throughout its length and these which number 24 in the holotype range according to the size of the shell from 20-27 in Kermadec material. A feature of the genus is the narrow ligamented area, most of which is posterior to the beaks. It is sculptured with from four to six long ligamental grooves which are almost horizontal and subparallel to the hinge line.

Kermadec examples of comparable size appear to be indistinguishable from the Hawaiian holotype, which is fully described and well figured.

It is likely that this species will be found in other shallow water stations in the South West Pacific.

This is a new record for the Kermadecs and is not "*Arca reticulata*" of Oliver, 1915, which is probably *Acar dubia kerma* Iredale, 1939 (Great Barrier Reef Exped. Moll. 1, p. 262).

Family PECTINIDAE

Genus PECTEN, Mueller, 1776.

Type (s.d. Children, 1823): *Ostrea maxima* Linn.

In the New Zealand Geological Survey Paleontological Bulletin, No. 26, "The Genus Pecten in New Zealand" (1957) Dr. C. A. Fleming gave a very comprehensive account of the Pacific invasion by the Mediterranean Pecten groups, *jacobaeus* and *benedictus*. He visualised geographic fluctuations for the derivatives of the cool water *jacobaeus* group and the warmer water *benedictus* group corelated in the Austro-Neozelanic area with Pleistocene-Recent climatic variation.

I am indebted to Dr. Fleming for his opinion regarding the Kermadec scallop described below, which he considers belongs to the *jacobaenus* group, not the *benedictus* group which includes the Eastern Australian *fumatus*. Like the New Zealand Castlecliffian *tainui* and the New Zealand Recent *novaezelandiae*, the Kermadec shell has lost almost all traces of secondary radial sculpture. It seems to be closest to *tainui*, differing only in rib profile and in its high swollen beak.

A similar, but even more recent, origin seems to be indicated for the large New Zealand benthic gastropod *Ranella multinodosa* (Bucknill). This is very close to, in fact almost identical with, the type of the genus, the Mediterranean Recent *Ranella gigantea* Lamarck, yet the genus is neither known from the New Zealand Pliocene-Pleistocene nor from intermediate Recent geographical areas.

Pecten raoulensis n. sp. Plate 10, Figs. 1, 2.

1915—*Pecten medius*: Oliver (non Lamarck, 1819), Trans. N.Z. Inst. 47, p. 553.

Shell very close to the New Zealand Castlecliffian *tainui* but smaller, more convex (right valve) and with a higher, more swollen beak. The radial ribs are broad with deeply channelled narrow interspaces but their edges are slightly rounded not sharp as in *tainui*. These ribs number 17-18 in *raoulensis* but only 14-15 in *tainui*. Those towards the anterior and posterior ends are bisected by a deeply incised groove and obsolescent multiple grooving is faintly indicated on most of the ribs.

The intercostal spaces are densely concentrically lamellate. The left valve is distinctly concave with rather narrowly rounded radial ribs and the whole surface is crowded with dense concentric lamellae.

The right valve is white tessellated with pinkish-brown at the beak. The left valve is dull pink with brownish maculations and white chevrons towards the umbo. The interior is white diffused with faint pinkish-brown at the margins.

Length, 83 mm.; height, 76 mm.; inflation 29 mm. (Holotype).

Locality: Galathea St. 674 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

Genus **AEQUIPECTEN** Fischer, 1887.

Subgenus **CORYMBICHLAMYS** Iredale, 1939.

Type (o.d.): *Chlamys corymbiatus* Hedley.

This genus was proposed for an elaborately sculptured tropical Queensland shell of suborbicular outline, subequivalve and almost equilateral, with both valves strongly convex. The sculpture consists of elevated strong radial ribs each bearing three radial series of scales connected laterally by thin lamellae. Interstices densely latticed by thin produced lamellae. The most distinctive feature of the shell is the elevated and distinctly grooved, or denticulate cardinal crura.

The species described below makes a second member of this interesting genus previously known only from the Queensland coast.

The Kermadec shell attains a far greater size and is not nearly so inflated but it has the same denticulate crura and comparable but even

more elaborate sculpture, the intercostal spaces bearing radial series of prominently elevated scales.

Aequipecten (*Corymbichlamys*) *iredalei* n. sp. Plate 11, Figs 1, 2; Text Fig. 2.

Shell of medium size and rather feeble inflation, moderately solid, length slightly greater than height, Subequivalve, right valve of slightly the greater convexity, subequilateral, the shell produced a little more posteriorly. Suborbicular except for well developed ears and a flat to slightly concave outline to the antero-dorsal and postero-dorsal margins, which show a divergence of from about 102° for medium sized shells to about 114° for the largest example.

Radials, strong broad corrugations with deeply channelled interspaces which vary between half and equal width of the radials. Seventeen radials, fourteen of them prominent and wide spaced, three marginal ones, crowded, one antero-dorsal and two postero-dorsal. Ears large, subequal. Surface sculpture very elaborate. Each primary rib bears seven narrow riblets, centre one most prominent, the whole crossed by dense concavely arcuate lamellae, continuous but produced into crisp scales where they cross the riblets; best developed at the flanks. Intercostal spaces bearing three radial series of closely packed prominent imbricating scales. Anterior ear bearing six radials in the right valve, which are rendered densely squamose by concentric lamellae. Posterior ear with eight to twelve similarly sculptured radials. Byssal sinus narrow, or moderate depth; ctenolium short with only four small teeth. Hinge line straight with a deep narrowly triangulate resilial pit and a pair of cardinal crura on each side of the resilifier. The outermost crura are long and parallel to the dorsal margin, in the left valve but slightly divergent to it in the right valve. A second still more divergent but very short pair of crura coalesce with the upper extremities of the provinculum. Both pairs of crura bear distinct crowded vertical taxodont-like grooves which have almost the magnitude of interlocking teeth. Colour of right valve pale orange-buff, broadly and irregularly blotched with pale orange-brown, left valve similarly patterned but in bright salmon-pink. Interior of right valve yellowish-buff turning to deep orange-brown at the dorsal edges, hinge plate and ears; left valve similarly coloured at the margins but diffused with deep carmine-pink over the central area, except where lightened with callus. Large examples have the interior more uniformly salmon-pink.

Height, 33 mm.; length, 35 mm.; thickness (2 valves) 10.7 mm. (Holotype).

Height, 58 mm.; length, 65 mm.; thickness (left valve) 11.0 (St. 674).

Height, 75 mm.; length, 84.5 mm.; thickness (right valve) 13.5 mm. (St. 674).

Locality: Galathea St. 675, $29^\circ 13.5' S.$; $177^\circ 57' W.$, off Raoul Island Kermadecs, 58-60 metres, 3:3:1952 (Holotype, one live shell); St. 674, $29^\circ 15' S.$; $177^\circ 57' W.$, off Raoul Island, 75-85 metres (gravel bottom; many dead shells); $\frac{1}{2}$ mile east of Philip Island, Norfolk Island, 33 fathoms (N.Z. Oceanographic Institute, Wellington) (valves).

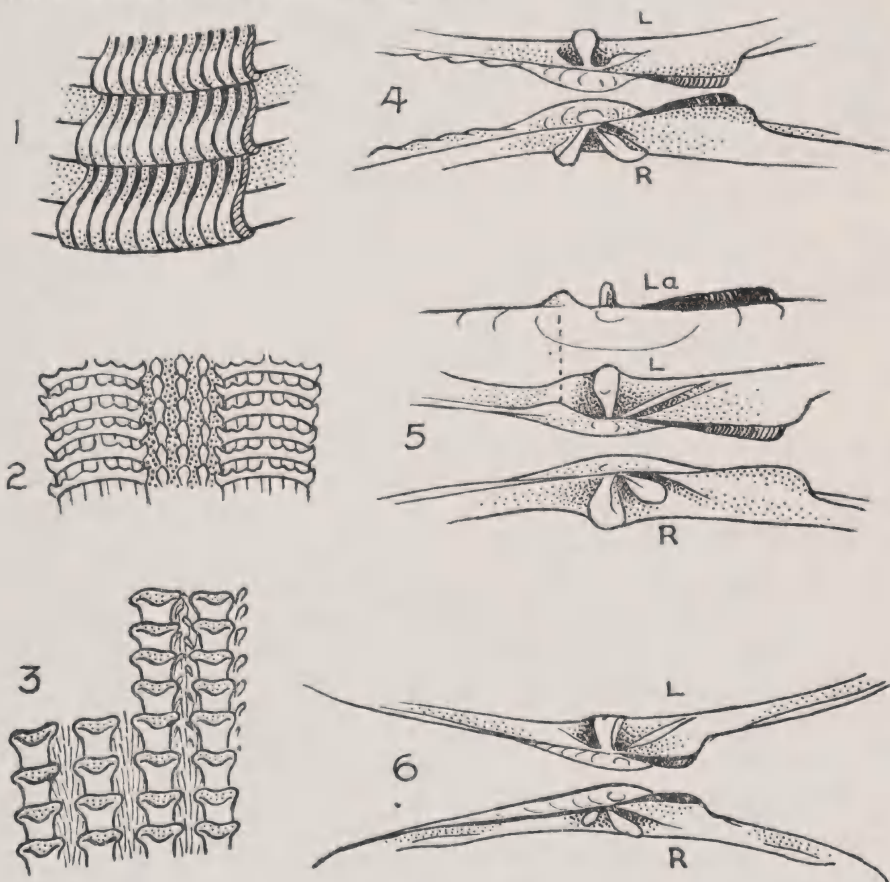
I am indebted to Mr. Tom Iredale of Sydney for the suggested relationship of this species with *Corymbichlamys corymbiatus* Hedley. Iredale's genus however, is quite similar to *Aequipecten* Fischer, 1887 based upon the European *opercularis* Linnaeus, it also shows vertical crural striations but they do not persist in the adults. Only the elaborate

sculptural development is wanting in *opercularis* although the lamellar arrangement is there in incipient form.

The relationship of the Kermadec shell is probably better expressed by retaining *Corymbichlamys* as a subgenus of *Aequipecten* for deeply corrugated species exhibiting the complex sculptural detail described above, plus a marked development of the crural striations throughout all stages of growth.

An evidently related species is the Hawaiian deep-water shell named *Cryptopecten alli*, gen. and sp. nov. by Dall, Bartsch and Rehder, 1938. This has even more elaborate sculpture than *Corymbichlamys*, with the rib lamellae fused into series of hollow blisters. The hinge bears distinct cardinal crura also.

I have not seen the Hawaiian shell so should Hedley's *Chlamys corymbiatus* and Dall, Bartsch and Rehder's species prove to be congeneric then *Cryptopecten* will replace *Corymbichlamys* for the Queensland and the Kermadec species.



TEXT FIGURE A.

Details of sculpture: 1. *Kermadysmea galathea* n. sp. 2. *Aequipecten* (*Corymbichlamys*) *iredalei* n. sp. 3. *Chlamys* (*Mimachlamys*) *asperrimoides* n. sp. Hinge structures. 4. *Kermadysmea galathea* n. sp. 5. *Dysmea occidens* (Gmel.) New Caledonia. (La = left valve from above showing lunular projection.) 6. *Asaphis nana* n. sp.

Genus **CHLAMYS** Roeding, 1798.Subgenus **MIMACHLAMYS** Iredale, 1929.Type (o.d.): *Pecten asperrimus* Lamarck.**Chlamys (Mimachlamys) asperrimoides** n. sp. Plate 11, Figs. 3, 4; Text Fig. 3.

Shell of medium size (30-45 mm.), moderately inflated, very like the Southern Australian *asperrimus* in shape but with fewer more narrowly rounded radial ribs, studded with closely spaced lamellate scales but no secondary radials, apart from occasional margining weakly spinose radials developed only in large examples and only towards the margin.

Outline ovate, taller than wide, slightly oblique, with the anterior auricle much the larger. Sculptured with 27 narrowly rounded sharply raised tubular radials densely imbricated with conspicuous spoon-shaped lamellate scales. Radial ribs otherwise smooth, but the interstices are crowded with microscopic *Camptonectes* radial striations. Anterior auricle of the left valve sculptured with nine spinose radials that of right valve with seven spinose radials. Six distinct teeth associated with the ctenolium which is deep, square ended and has strong transverse lamellae in the deep-set byssal groove. Colour dull brownish red, paler towards the umbos. Interior dull pinkish-grey tinged with brownish-red at the margins.

Height, 20.2 mm.; length, 18.0 mm.; thickness (both valves) 6.8 mm.

(Holotype).

Height, 30.6 mm.; length, 27.15 mm.; thickness (one valve) 6.0 mm.

(Galathea St. 674).

Height, 42.5 mm.; length, 39.3 mm.; thickness (one valve) 10.0 mm.

(40-50 fathoms, Norfolk Is.).

Localities: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island Kermadecs, 75-85 metres (one valve only); from cable 45-50, fathoms to south of Norfolk Island (W. Foster, C. S. "Recorder," 1931, holotype); ½ mile east of Philip Is., Norfolk Island, 33 fathoms (N.Z. Oceanographic Institute, Wellington).

Holotype: Auckland Museum.Genus **CHLAMYDELLA** Iredale, 1929.Type (o.d.): *Cyclopecten favus* Hedley.**Chlamydella favus lemchei** n. subsp. Plate 9, Figs. 7, 8.

Shell small thin suborbicular, right valve larger and slightly more convex than the left. Sculpture discrepant, that of the left valve the stronger, consisting of a microscopic dense linear spaced cover of divergent meandering weakly squamose rounded threads crossed over the early growth stages by crisply regularly spaced concentric lamellae which rapidly diminish and become obsolete; that of the right valve, visible only under high magnification, shows a very dense surface network pattern resolving into narrow hexagonal spaces arranged in radial series.

Left valve with the umbo sharp and projecting beyond hinge line, right valve with umbo smaller and not extending beyond hinge line.

Auricles unequal, the anterior narrow and produced, sculptured with ten crisp radials latticed by lamellae. Colour of left valve yellowish-brown diffused with light reddish-brown which sometimes resolves into a radiate or even a chevroned pattern.

Right valve with a well defined byssal sulcus but not ctenolium.

Length, 4.5 mm.; height, 4.5 mm. (Holotype—left valve).

Length, 5.9 mm.; height, 5.5 mm. (Paratype—right valve).

Locality: Galathea St. 674, 29° 15' S.; 177° 5' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

The Kermadec shell appears to be very closely allied to the New South Wales *farvus* Hedley, differing only in the rapid obsolescence of the concentric lamellae in the left valve, with a compensating stronger development of the radial sculpture.

Family LIMIDAE

Genus **LIMATULA** Searles Wood, 1839.

Type (Gray, 1847): *Pecten subauriculata* Montagu.

Limatula oliveri n. sp. Plate 9, Fig. 4.

This is no doubt the species Oliver recorded from the Kermadecs in 1915 under *Lima bullata* (Born) but at that time the species name applied to shells from both New Zealand and Australia. Since then Finlay (1926, p. 454) quoted Hedley's preference for *strangei* Sowerby for the East Australian shell on the grounds that Born's *bullata* was a West Indian shell, and at the same time Finlay recognized the New Zealand shell as distinct in shape and sculpture from the Australian shells and separated the former under a new name *maoria*.

Later (1939, p. 390) Iredale proposed a new genus *Stabilima* for these shells, but there do not seem to be valid reasons for discontinuing the use of *Limatula* S. Wood based upon the English *Lima subauriculata* Montagu.

Specifically the Kermadec shells fit neither *strangei* nor *maoria*, but are somewhat nearer to the Australian than to the New Zealand shells.

The Kermadec species is therefore here described as new and its differentiating characteristics are narrow form with a short hinge line and strong narrowly crested radials, forming in end profile a regular zigzag with the troughs of the interspaces as narrow as the crests of the ribs.

Shell small, white, thin, elongate-oval constricted to a very short hinge line. About 32 narrowly angulate radial ribs, as described above, crossed by dense concentric lamellae more prominent in the grooves than on the radials.

Height, 7.0 mm.; length, 4.2 mm.; diameter (one valve), 2 mm. (holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

This is the second species of *Limatula* from the Kermadecs; the other, *L. insularis* Oliver, 1915, is a very small shell, 3.5 mm. in height, and it is broad with very few strong broadly rounded radials.

Genus **DIVARILIMA** n. gen.Type: *Lima sydneyensis* Hedley.

The species *Lima sydneyensis* has been long considered an anomalous form and as recently as 1956 Dell (p. 26) reiterated this, but preferred to retain the species in *Lima* (s.l.) until the already published generic names in the family are satisfactorily evaluated.

However, *Lima sydneyensis* is a very distinctive member known so far only from Sydney, New South Wales, Northland, New Zealand, and now from off Raoul Island, Kermadecs.

Briefly it is a miniature *Lima* with a *Ctenoides* sculptural pattern of divaricating threads. It resembles the typical species except that a mature stage of arrested growth is reached at a small size, corresponding with the early post-larval stages in *Lima* typical.

Divarilima sydneyensis Hedley.

1901—*Lima brunnea* Hedley, Proc. Linn. Soc. N.S.W., 26, p. 21, Pl. II, Figs. 7, 8.

1904—*Lima sydneyensis* Hedley n. nom. for *brunnea* Hedley, 1901 (non Cooke 1886) Proc. Linn. Soc. N.S.W. 26, p. 200.

Type Locality: Within Sydney Heads, 8 fathoms, New South Wales (living); Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres (a number of bleached valves).

Dell (1956, p. 26) after examining a single topotypic valve of *sydneyensis* in the Suter collection (N.Z. Geological Survey) confirmed Suter's reference of New Zealand occurrences to this species.

Comparing this same topotype with the Kermadec material I can see no differences, but the New Zealand specimens are a trifle narrower, with a slightly longer posterior slope, and the anterior slope is a flatter curve not produced forwards to the same extent.

The New Zealand form has a littoral habitat, attached to undersides of stones at low tide, but the Australian form has been taken alive only by shallow dredging. My Discovery II record of the New Zealand shell from 260 metres off the Three Kings Islands is based upon bleached valves evidently washed down from shallower water. The living habitat of the Kermadec shells is not known, but may well prove to be from shallower water also.

The apparent slight variation in the shape of the New Zealand examples cannot be confirmed until a series of topotypes is available.

Family CRASSATELLIDAEGenus **SALAPUTIUM** Iredale, 1924.Type (o.d.): *Crassatella fulvida* Angas.**Salaputium iredalei** n. sp. Plate 9, Fig. 6.

Shell small, solid, obliquely ovate-trigonal, strongly convex, sculptured with heavy rounded concentric ribs; colour cinnamon to pale reddish-brown externally, irregularly splashed and chevroned with dark reddish-brown. Interior shining, reddish-brown. Umbos situated

medially, smooth, rounded and projecting like a minute pin-head. Anterior slope concave, steeply descending and narrowly rounded at lower third of height. Posterior slope convex, narrowly rounded above middle height, then somewhat flattened to about lower fifth of height. Ventral margin evenly strongly arcuate. Concentric ribs broadly rounded, about 17 in the adult, with interspaces about half the width of the ribs. Surface crowded with very fine crisp radial threads, more distinct in the interspaces. Hinge plate deep, very oblique. Right valve with a single long narrow arcuate forwardly directed cardinal and a broadly triangular resilifer behind it. Left valve with two closely spaced arcuate, forwardly directed cardinals anterior to the resilifer, the innermost narrow and margining the resilifer, the other larger and much thickened below. A long anterior and a long posterior lateral in each valve. Ventral margin finely crenulated within. Well marked smooth lunule and escutcheon. Anterior and posterior adductors small, subequal, pallial line entire. The holotype and the majority of examples have in addition to odd splashes of reddish-brown a single large clearly marked inverted chevron occupying the lower half of each valve.

Height, 5.0 mm.; length, 6.0 mm.; diameter (both valves) 3.4 mm (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

The species closely resembles the group of East and South Australian members of this genus but has a much greater convexity.

The presence of the genus at the Kermadecs was recorded by Mr. Tom Iredale in 1924 (Proc. Linn. Soc. N.S.W., vol. 49, p. 204) so I now have pleasure in naming it in his honour.

This shell was the most abundant species in the "Galathea" Kermadec dredgings.

Family SANGUINOLARIIDAE

Genus **KERMADYSMEA** n. gen.

Type: *Kermadysmea galathea* n. sp.

A new genus is essential for the reception of the elaborately sculptured Kermadec Gariid described below. It is apparently closest to *Dysmea* Dall, Bartsch and Rehder, 1938, based upon *Solen occidentis* Gmelin, but lacks the lunular marginal projection of the left valve, which is characteristic of that genus.

In *Kermadysmea* (Text Fig. 4) the cardinals of the right valve are widely divergent as in *Gari* but with the posterior cardinal much the stronger. In *Dysmea occidentis* (Text Fig. 5) the anterior cardinal is much the stronger and is situated vertically beneath the umbo, with the posterior cardinal at 45° behind it.

The outline of the shell of the Kermadec genus is similar to that of *Dysmea*, even to the flexed and slightly gaping posterior end but the broad deep pallial sinus slopes upwards at about 30° to the ventral margin, not parallel to the ventral margin as in *Dysmea*.

A thin fragile shell, heavily and elaborately sculptured with numerous concentric folds crossed by a dense surface pattern of radial threads further characterizes this remarkable genus.

Kermadysmea galathea n. sp. Plate 10, Fig. 4; Text Fig. 1 and 4.

Shell, large, thin, fragile, elongate-rectangularly ovate, pale pinkish-buff irregularly radially rayed with salmon-pink. Dorsal margin slightly curved, with the umbones situated a little nearer to the anterior end which is narrowly rounded with the point of greatest convexity above middle height. Posterior end slightly gaping and flexed with a bias to the left, broadly rounded with the point of greatest convexity below middle height. Ventral margin straight. Sculpture of numerous rounded concentric ribs crossed by a dense surface pattern of linear-spaced radial threads which curve over the concentric ribs, giving a dense comb-like effect (Text Fig. 1). Interior of shell smooth, only slightly corrugated by the external ridges. Posterior muscle scar large almost twice the size of the anterior one. Pallial sinus deep, reaching the middle of the shell, broad non tapered with a bluntly rounded apex and set at about 30° to the ventral margin. Ventral margin smooth within but densely cusped externally by the radial threads which slightly overhang the margin. Hinge plate narrow, without laterals. Right valve with two divergent cardinals, posterior one the stronger. Left valve with two cardinals, a heavy triangulate one immediately below the umbo and a thin short lamellate one parallel with the hinge plate and situated posteriorly. Nymph broad and short extending above the dorsal margin. Lunule very long and narrow.

Height, 21.0 mm; length, 44.0 mm.; diameter (both valves) 11.7 mm.

(Holotype).

Locality: Galathea St. 676, 29° 13' S.; 177° 57' W., off Raoul Island, Kermadecs, 83 metres.

Genus ASAPHIS Modeer, 1793.

Type (monotypy): *Venus deflorata* Linn.

One of the most abundant bivalves from the Kermadec dredgings is a very small *Asaphis*, at first sight likely to be mistaken for the juvenile stage of the common, widely distributed, large, Indo-West Pacific *Asaphis dichotoma* (Anton, 1839) (= *tahitensis* Reeve) commonly misnamed *deflorata* Linn., which name should be restricted to the closely allied West Indian species.

The Kermadec shell is probably an adult, for it has rather numerous rest stages despite its small size for the genus. Compared with juvenile stages in *dichotoma* the Kermadec shells are much more elongate and have the concentric sculpture rather than the radial element the stronger.

Although *dichotoma* has an extensive Indo-West Pacific range it is essentially a tropical species apparently reaching its northern limit in the Ryukyu Islands, 24°-26° N. and its apparent southern limit at Mauritius, 20° S., for the Indian Ocean, Tonga and Cook Islands, 20°-21° S. for the South West Pacific and to about 24° S. down the Queensland coast. It is not recorded from the Hawaiian group, 18°-28° N.

The latitude of Raoul Island, Kermadecs is 29° 15' S., presumably out of bounds for *dichotoma* but it is likely that the Kermadec species originated as a mutant at some time from assumed repeated spat-falls of that species drifted down from warmer northern waters. Lower temperatures and different ecological station could account for a dwarf

derivative of this species. Under normal conditions *dichotoma* lives deeply buried in coarse coral sand and gravel in the intertidal zone.

It is significant that all the Kermadec shells attain a uniform small size and that there are no records of large *dichotoma* valves in beach drift.

The phenomenon of nanism in Kermadec bivalves is shown also in *Nemocardium (Pratulium) probatum* and *Pitarina* cf. *affinis*.

***Asaphis nana* n. sp. Plate 9, Fig. 5; Text Fig. 6.**

Shell very small for the genus, beaks median, elongate-ovate, rather thin with dense concentric sculpture and well developed radials at the sides. Concentric ridges prominent, numerous, narrow and rounded but not lamellate, crossed by about forty radials which are obsolescent medially but relatively strong laterally, especially over the posterior end. Weakly gemmate at the point of intersection between the concentrics and the more prominent radials. Both ends of shell broadly rounded, anterior dorsal slope and ventral margin rather straight, posterior dorsal slope convexly arcuate. Hinge typical; right valve with a small short oblique anterior cardinal and a moderately large very oblique posterior cardinal; left valve with a rather large triangular cardinal set vertically beneath the umbo and a relatively long oblique narrow cardinal, set obliquely behind it. Both the anterior right valve cardinal and the posterior left valve cardinal have a weak bifid tendency. Pallial sinus broad and deep extending to directly beneath the umbo. Colour buff irregularly and sparingly maculated and obscurely radially banded in pale yellowish-brown. Interior pale buff with the external maculation and banding showing through. Little variation in colour except for occasional uniformly canary yellow examples.

Height, 5.6 mm.; length, 9.8 mm.; thickness (two valves) 3.3 mm. (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres (numerous, alive).

Family VENERIDAE

Genus PITARINA Jukes-Browne, 1913.

Type (o.d.): *Cytherea citrina* Larmarck.

***Pitarina* cf. *affinis* Gmelin, 1790.**

1790—*Venus affinis* (Gmelin, 1790). Syst. Nat. (Ed. 13), p. 3278.

1954—*Pitar (Pitarina) affinis*: Kira, Coloured Illus. Shells of Japan, Pl. LVII, Fig. 10.

This is another instance of a widespread tropical Indo-West Pacific shell which does not appear to reach maturity in Kermadec waters although it was abundant both alive and dead in the Galathea dredging.

Since the Kermadec material is small the identification is not claimed with certainty. The largest of the odd valves measures only 13.75 mm. in height by 18.20 mm. in breadth. The colour pattern is sparse consisting of a few irregular markings in light reddish-brown as in Kira's figure.

Height, 8.4 mm.; breadth, 11.0 mm.; thickness (two valves) 5.7 mm.

Height, 11.4 mm.; breadth, 14.4 mm.; thickness (two valves) 8.0 mm.

Height, 13.75 mm.; breadth, 18.20 mm. (one valve).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres.

The genus is a new record for the Kermadec fauna.

Family CARDIIDAE

Genus **TRACHYCARDIUM** Moersch, 1853.

Subgenus **VASTICARDIUM** Iredale, 1929.

Type (o.d.): *Cochlea nebulosa* Martyn.

Trachycardium (Vasticardium) sorenseni n. sp. Plate 11, Figs. 6, 7.

Shell small for the genus (25-45 mm), subcircular, almost equilateral, little inflated. Beaks acute, flattened and incurved. Sculpture consisting of 54 flat-topped radial ribs sharply defined by deeply channelled linear interspaces crenulate at the sides. Anterior and ventral margins delicately corrugated, posterior margin strongly digitate. Posterior area of ribbing bearing chevron shaped concentric ridges mostly developed into bluntly pointed spines. Hinge plate short and strongly arched. Right valve with one prominent narrowly triangulate vertical cardinal, two strong anterior laterals, fused at their proximal ends, and one short, ill-defined posterior lateral.

Colour (young fresh example) pinkish-white heavily blotched with orange-pink. Interior with the external colour pattern showing through. The holotype, a faded beach shell, shows a sparsely speckled pattern on a pale ground.

Height, 20.5 mm.; length, 20.0 mm.; thickness (one valve) 5.0 mm. (Sta. 674).

Height, 26.5 mm.; length, 25.0 mm.; thickness (one valve) 7.5 mm. (Sta. 674).

Height, 42.25 mm.; length, 40.5 mm.; thickness (one valve) 12.5 mm.

(Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, 75-85 metres (valves only); Denham Bay, Raoul Island (odd valves) J. H. Sorensen (Holotype).

Holotype: Auckland Museum.

This species belongs to the *arenicola-cygnorum* group, nearer to the latter, but differs from both in its finer and denser ribbing and more circular outline. They belong to the subfamily *Trachycardiinae* which is characterised by a short hinge, digitate posterior margin and rib sculpture usually in the form of spines or scales along the posterior sides of the ribs.

These shells plus several other Indo-Pacific species differ from the massive *Trachycardium* and *Vasticardium* in their lighter build, smaller size and acute flattened beaks, but they are here retained in *Vasticardium* pending a better understanding of the tropical Pacific species.

Two valves from a New Zealand Oceanographic Institute station, $\frac{1}{2}$ m. E. of Philip Is., Norfolk Island, 33 fathoms are similar to the Kermadec species in sculpture but are of oblique-ovate outline. These probably represent a further new species. Following is a rib count for the three related species: *cygnorum* Deshayes, 40-43; n. sp.? Norfolk Island, 48-50; *sorenseni* n. sp., 54.

Genus NEMOCARDIUM.

Subgenus PRATULUM Iredale, 1924.

Type (o.d.): *Cardium thetidis* Hedley.

Nemocardium (Pratulium) probatum Iredale, 1927.

1915—*Protocardia pulchella*: Oliver, Trans N.Z. Inst. 47, p. 556 (not of Gray).

1904—*Cardium bechei*: Hedley, Proc. Linn. Soc. N.S.W., p. 195 (not of Reeve).

1927—*Pratulium probatum*: Iredale, Austr. Zoologist 4 (6) p. 333, Pl. XLVI, Fig. 8.

Type Locality (*probatum*): Trial Bay, New South Wales, Height, 28 mm.; breadth, 30 mm.

I have not seen the specimens from 30 metres off Meyer Island, Kermadecs upon which Oliver's record of the New Zealand *pulchellum* is based but they will almost certainly prove to be identical with the "Galathea" material which is a dwarf form of the widely distributed eastern Australian *probatum*, formerly recorded from there under the name of *bechei*, a Philippine species.

The largest of the Kermadec shells is only 14.7 mm. in height but Australian examples frequently attain three times that size and one from New South Wales recorded by Iredale (1927, p. 334) is 78 mm. in height.

I have not been able to examine Kermadec and Australian material of comparable size, for the largest Kermadec specimen I have is smaller than any Australian specimen available to me.

The following table of measurements shows the Kermadec shells to be proportionately broader than high and the larger Australian examples to have these two dimensions equal or nearly so but this slight proportional difference is probably consistent with a normal growth gradient.

The Kermadec shells are either a dwarf race, an ecological form induced by the nature of the habitat or the true station for fully matured adults has not yet been located.

Height 10.00 mm.; breadth, 11.10 mm.;	Kermadecs, St. 674.
Height, 10.60 mm.; breadth, 13.75 mm.;	Kermadecs, St. 674.
Height, 12.90 mm.; breadth, 14.20 mm.;	Kermadecs, St. 674.
Height, 13.00 mm.; breadth, 14.10 mm.;	Kermadecs, St. 674.
Height, 13.80 mm.; breadth, 15.10 mm.;	Kermadecs, St. 674.
Height, 14.10 mm.; breadth, 15.30 mm.;	Kermadecs, St. 674.
Height, 14.70 mm.; breadth, 15.40 mm.;	Kermadecs, St. 674.
Height, 16.20 mm.; breadth, 16.25 mm.;	Darwin.
Height, 27.70 mm.; breadth, 29.70 mm.;	New Caledonia.
Height, 44.00 mm.; breadth, 46.00 mm.;	Percy Island.
Height, 69.00 mm.; breadth, 69.50 mm.;	Noosa, Queensland.
Height, 78.00 mm.; breadth, 81.00 mm.;	New South Wales.

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres; $\frac{1}{2}$ mile East of Philip Is., Norfolk Island, 33 fathoms (N.Z. Oceanographic Institute, Wellington).

Family CUSPIDARIIDAE

Genus **AUSTRONEAERA** Powell, 1937.

Type (o.d.): *Austroneaera brevirostris* Powell.

Austroneaera raoulensis n. sp. Plate 9, Fig. 9.

Shell small, thin, white, semitransparent, ovate-trigonal, almost equilateral; rostrum short, truncated. The species is very similar to *Austroneaera brevirostris* Powell, 1937, from 260 metres off the Three Kings Islands, New Zealand. It differs only in having more bluntly rounded beaks and much more prominent anterior and posterior hinge teeth in the right valve. The left valve has anterior and posterior thickened hinge margins the former commencing with a slight boss which is probably the basal support for a lithodesma as in *A. wellmani* Fleming, 1948, from Dusky Sound in 18 fathoms, New Zealand.

Length, 3.75 mm.; height, 2.6 mm.; thickness (one valve) 1.0 mm.

(Holotype, right valve).

Locality: Galathea St. 674, 29° 15' S.; 177° 51' W., off Raoul Island, Kermadecs, 75-85 metres (odd valves only).

Family TROCHIDAE

Subfamily CALLIOSTOMATINAE

Genus **FAUTOR** Iredale, 1924.

Type (o.d.): *Zizyphinus comptus* A. Ad.

Fautor consobrinus n. sp. Plate 9, Fig. 2.

Shell small, imperforate, biangulate, narrowly conical, thin, subnacreous. Spire turreted, with two prominent spiral keels per whorl, the upper strongly gemmate the lower gemmate at first but smooth over the lower two whorls. The suture is margined by a rounded spiral thread and there are two other smooth spiral intermediate threads, one between the suture and the upper keel and the other between the two keels. Whorls seven including a minute protoconch of one whorl, abruptly terminated by a rounded varix, globular and obliquely somewhat immersed at the tip, shining but sculptured with two spiral cords crossed over the latter half by minute crisp radial threads.

The base is flattened, and bears nine strong sharply raised flat-topped spiral cords, outermost much stronger than the rest and forming a third keel to the body-whorl emergent at the suture over the last half-whorl. Aperture rhomboidal, pillar oblique but almost straight. Colour pale pinkish buff, the spirals maculated with alternate white and dull pink spots.

Height, 6.3 mm.; diameter 5.0 mm. (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

The species seems to be quite well placed in the Austro-Neozelanic Calliostomid genus *Fautor*, members of which have a very small paucispiral protoconch marked off by a terminal varix and with the nuclear lip somewhat immersed.

The protoconch of the Kermadec species is almost identical with that of Odhner's *onustus* from Cape Maria van Diemen, New Zealand, in 50 fathoms.

The Australian members have a similarly shaped protoconch but the sculptural detail varies considerably with the species.

In the type species, *comptus* (A. Adams) it is faintly malleated, in *allporti* (Tenison-Woods) it is malleated also but develops spirals and axials over the latter half of the whorl and in *legrandi* (Tenison-Woods) the whole protoconch is deeply pitted in honeycomb fashion.

Family CYPRAEIDAE

Genus RAVITRONA Iredale, 1930.

Type (o.d.): *Cypraea caputserpentis* Linn., 1758.

Ravitrona tomlini kermadecensis n. subsp. Plate. 10, Fig. 5.

1915—*Cypraea flaveola*: Oliver, Trans. N.Z. Inst. 47, p. 526 (non Linn., 1758).

1939—*Erosaria tomlini*: Iredale, Austr. Zool. 9 (3) pp. 299 & 307 (non Schilder 1930).

1956—*Ravitrona tomlini prodiga*: Allan, Cowry Shells of World Seas, Georgian House, Melbourne, p. 94 (non Iredale, 1939).

This shell was first recorded from beach specimens cast up on Sunday Island (Oliver, l.c.) but the name *flaveola* is now considered to be indeterminate (Allan l.c. p. 92).

The Kermadec shell belongs to the group of *tomlini-cernica*, and is best expressed as a subspecies of *tomlini*; the type locality for which is New Caledonia. The species *cernica* comes from Mauritius. Miss Allan (1956 l.c.) includes the Kermadec shells in the subspecies *prodiga*, the type of which is from Newcastle, New South Wales.

After examining the Australian Museum material, which includes all the above mentioned subspecies, I found a constant differentiating character in the parietal labial teeth which serves to readily distinguish the Kermadec race.

In *tomlini tomlini* the parietal teeth are long at the posterior end but short over the anterior end, not graded but suddenly stepped just posterior to the middle.

In *cernica* there is this same stepped arrangement but the shell is more broadly ovate. In *tomlini prodiga* the teeth are short and evenly graded throughout. The Kermadec subspecies has evenly graded teeth also but they are long, extending medially almost a third of the way across the basal callus.

Shell shining but not highly polished. Dorsum dull orange marked with evenly distributed but irregularly sized white spots. Sides, base, teeth and interior porcellanous white. Margins coarsely pitted, a few dark reddish-brown spots in the anterior and posterior series of pits

and others sparsely and irregularly distributed along the sides, more numerous along the labial side.

Labial teeth 19, columellar teeth, 18, exclusive of the anterior and posterior ridges and two strong denticles on the fossula.

Length, 24 mm.; breadth, 15 mm.; dorso-ventral 11.75 mm. (Holotype).

The type is a crassate adult but Iredale (1939, p. 307) records a Kermadec example 31 mm. in length.

Locality: Galathea St. 675, 29° 13.5' S.; 177° 57' W., off Raoul Island, Kermadecs, 58-60 metres, 3:3:1952.

Family CASSIDIDAE

Genus *ONISCIDIA* Swainson, 1840.

Type (Wenz, 1941): *Oniscia cancellatum* Sowerby

Oniscidia bruuni n. sp. Plate 11, Fig. 5.

Shell of moderate size for the genus, pyriform with low spire, massive internally denticulate labial varix and adult sculpture of prominent rounded axials coronated at the shoulder. The whole surface, including the axials, crowded with vertical sharply raised threads. Spiral sculpture of weak rather widely spaced low rounded cords, distinct only over the lower part of the base. Whorls 7 including a smooth conical protoconch of three lightly convex whorls with a supramargined suture and terminated abruptly with a thin concave varix; apex small and erect. Spire whorls sharply angled and coronated above the middle and with a second weak spiral ridge just above the suture on the penultimate. Spire about one sixth height of aperture, angle 95°, axials broadly rounded 15 to 16 per whorl, coronated as sharp upcurved spines at the shoulder and continued to the suture as thin lamellae. Nine regularly spaced obsolescent rounded spiral cords between the shoulder and the fasciole on the body-whorl. Fasciole with five weak spiral threads crossed by numerous axial growth lines. Outer lip massive, smooth, recurved and sharp edged on the outside, bearing 16 denticles on its inner face. Parietal callus spread more than halfway across the front of the body-whorl and with a sharp raised edge. Parietal wall with 13 denticles, those above more elongated, as entering lamellae and a few weak tubercles over lower part of the pillar. Anterior canal short, recurved, with a rather deep rounded sinus. Posterior canal a well defined groove. Colour pale pinkish-brown with four spiral zones of light reddish-brown on the body-whorl; uppermost occupies the shoulder and lowest is immediately above the fasciole. Each zone terminates on the labial varix in a scattering of dark brown speckles. Apertural callus white but diffused with dark reddish-brown on the parietal whorl.

Height, 32.5 mm.; diameter, 21 mm. (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

This species is not closely allied to any of the described recent species. In shape it resembles *exquisita* Adams and Reeve from the

Sooloo Archipelago but that species has heavy spiral ridges dominating the axials. The New Zealand lower Miocene (Altonian) *finlayi* Laws, 1932, is probably of the same lineage as *bruuni* for it has the pyriform shape and dense vertical surface lamellae but the spiral sculpture is almost as strong as the axial.

This unique very handsome specimen is named in honour of the leader of the "Galathea" Expedition, my esteemed friend Dr. Anton F. Bruun.

Family XENOPHORIDAE

Genus **XENOPHORA** G. Fischer, 1807.

Type (Gray, 1847): *Trochus conchyliophorus* Born.

Xenophora neozelanica Suter.

1907—*Xenophora neozelanica* Suter, Trans. N.Z. Inst. 40, p. 346.

1915—*Xenophora corrugata*: Oliver, Trans N.Z. Inst. 47, p. 524.

This species, under the name *corrugata* (Reeve), was recorded by Oliver (l.c.) alive in 30 metres near Meyer Island, Kermadecs. Several adult dead shells from "Galathea" St. 674, off Raoul Island, confirm the identity of the species with the northern New Zealand *neozelanica* Suter, 1908.

Family MITRIDAE

Genus **MITROPIFEX** Iredale, 1929.

Type (monotypy): *M. quasillus* Iredale.

Mitropifex iredalei n. sp. Plate 11, Fig. 3.

Shell (12-15 mm.) elongate-fusiform. Spire tall, slightly more than half height of shell. Spire-whorls lightly convex, body-whorl with flattened sides, suddenly contracted to the neck. Whorls $10\frac{1}{2}$ to 11 including a small polygyrate shining smooth cylindrical protoconch of $3\frac{1}{2}$ whorls, the tip low dome-shaped. Post-nuclear sculpture of sharply raised, closely spaced, erect but slightly flexuous, narrowly rounded axials, 27 to 29 per whorl, and interstitial spiral cords as strong as, or even stronger than, the axials, increasing from four to seven on the spire-whorls and 15 on the body-whorl plus two stronger cords on the neck, followed by six weak ones on the fasciole. The rectangular sculptural interspaces are wider than high, those on the base mostly three times as wide as their height. Although the spirals do not cross the axials the interstitial grooves over the base and neck connect series of notches across the axials, resulting there in weak to moderate gemmulation.

Aperture narrow, produced into a moderate flexed and recurved canal with a distinct sinus, oblique to the axis. Outer lip thin. Columella bearing four plaits, uppermost very strong, diminishing proportionately to the fourth which is very weak.

Ground colour pale fawn, spirally zoned with pale reddish-brown. There is a broad zone over the middle area of the spire-whorls, a narrow one masked by the suture and another broad one on the base. The pattern is variable and may consist, as in the holotype, of only spots and splashes, but still arranged in zones.

Height, 14.7 mm.; diameter, 5.4 mm. (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

The type of the genus is a New South Wales shell ca. 31 mm. in height. The Australian species has fewer axials (20 per whorl) and the coloration is reddish-brown with a white band encircling the periphery.

Iredale does not state how his genus differs from Swainson's *Costellaria* which is of very similar facies. However until more work is done on the systematics of this extensive and difficult family it is preferable to preserve the undoubted close relationship between the Australian and Kermadec species by using Iredale's genus.

It is noted that Cotton, 1957, in No. 12, Family *Mitridae* (Royal Society of South Australia, Malacological Section) includes in *Mitropifex* the following species: *sculptilis* Reeve, 1845, Cape York, Queensland, *obeliscus* Reeve, 1845, Queensland, and *escharoides* Tate, 1889. Victorian Miocene.

Another apparently related genus is *Arenimitra* Iredale, 1929, proposed with *arenosa* Lamarck as type and including the *exasperatorulosa* series. These shells are distinctly shouldered and have prominent lyrate axials crossed by lesser spiral cords. In *Mitropifex* the axials and spirals are about equal, producing a clathrate appearance and the shoulder is slight.

Family CONIDAE

A satisfactory division of the *Conidae* into generic and subgeneric groups still remains to be achieved, but pending a revision of the entire family upon morphological lines, which is going to be a long and tedious task for someone, it would seem to be useful to continue to employ the existing divisions, but conservatively, as subgenera, until they can be properly evaluated.

Several recent workers (Clench, 1942, the Genus *Conus* in the Western Atlantic, *Johnsonia* Vol. 1, No. 6, and Abbott, 1953, American Seashells), have completely disregarded all published names in the *Conidae* other than the type genus *Conus*.

On the other hand, Cotton (1945, A Catalogue of the Cone Shells (*Conidae*) in the South Australian Museum, Records of the South Australian Museum, Vol. 8, No. 2) made a very creditable attempt to fit the cones of the world into the existing nomenclature with the addition of several new names.

Most of Cotton's groups appear to be natural, but a few such as *Asprella* Schaufuss, 1869, savour strongly of a convenient dumping ground for all strongly spirally sculptured cones. The type of *Asprella* is the moderately large and heavy, low-spined and broadly conic oriental *sulcatus* Bruguière. With it are included the small tall-spined, biconic sculptured cones such as the well known West Indian *verrucosus*

Hwass, but strangely the rather similar *jaspidicus* Gmelin, also West Indian, is referred by Cotton to *Leptoconus* Swainson, 1840.

It would seem that the sculptured cones require at least the segregation of the small biconic members from those grouped around the type of *Asprella*.

Genus **CONUS** Linnaeus, 1758.

Subgenus **KERMASPRELLA** n. subgen.

Type: *Conus raoulensis* n. sp.

Shell small, slender, biconic with a moderately deep sutural sinus and sculptured with prominent gemmate spiral cords. Protoconch polygyrate and smooth, with a papillate tip.

Conus (Kermasprella) raoulensis n. sp. Plate 9, Fig. 1.

Shell small (16 mm.-18 mm.), narrow, biconic with tabulated spire; periphery nodulose, body-whorl strongly sculptured with numerous rounded spiral cords regularly thickened into vertically compressed gemmules. Colour salmon with the peripheral nodules picked out in white. Three bands of irregular rectangular white patches on the body-whorl. Interior of aperture pale pink. Whorls about 10, including the protoconch which is eroded in the holotype and all available adult samples. A juvenile exhibits a polygyrate narrowly conic smooth erect protoconch of four whorls with a papillate tip. Spire stepped by a nodulose carina immediately above the suture, which is adpressed and cusped between the nodules. Peripheral nodules strong, vertically compressed, 16 to 17 per whorl. Shoulder concave, sculptured with dense crisp concavely arcuate threads. Body whorl sculptured with about 25 irregularly developed spiral cords, seven of which are primary and the rest intermediate. Most of the cords bear vertically compressed gemmules. Aperture narrow, oblique of approximately even width throughout. Sinus sutural, moderately deep.

Height, 18.0 mm.; diameter, 9.4 mm. (Holotype).

Locality: Galathea St. 674, 29° 15' S.; 177° 57' W., off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

Subgenus **DAUCICONUS** Cotton, 1945.

Type (o.d.): *Conus daucus* Brug.

Only one endemic Kermadec cone (*Conus kermadecensis* Iredale, 1912) was known prior to the "Galathea" expedition. This is a littoral species allied to the widely distributed Indo-West Pacific *planorbis* Born, 1780.

The Galathea dredgings produced a large living example of typical *planorbis* and a series of a new species of the same group. Oliver (1915, pp. 541, 542) recorded the following well known tropical Pacific cones as odd beach shells from Raoul (Sunday) Island. They were *vermiculatus* Larmarck, *minus* Gmelin, *maculosus* Sowerby and *virgo* Gmelin, but none of these have been found living at the Kermadecs. The islands are almost out of range for cones, which are mostly confined to the tropics, but it appears that *planorbis* has become a

successful immigrant and in doing so is in the process of diverging to fill the ecological niches of its newly acquired territory.

The differentiating characters of the three Kermadec cones of the *planorbis* series are best shown in key form as follows:

Spire low (115° - 135°)

Shoulder carina greatest shell width

Body-whorl straight-sided

Sculpture: spire, 1-3 spiral cords

body-whorl, spiral epidermal processes on narrow
colour lines *planorbis*

Spire taller (93° - 100°)

Shoulder carina not greatest shell width

Body-whorl evenly convex

Sculpture: spire, obsolete

body-whorl, obsolete except for a few basal spirals

Colour uniform except for central pale band . . . *kermadecensis*

Body-whorl convex above, concave below.

Sculpture: Spire, 6-8 spiral cords

body-whorl, spiral epidermal processes on weak spiral
threads.

Colour pattern of three irregular reddish-brown spiral zones . . .
bruuni, n. sp.

Conus (Dauciconus) bruuni n. sp. Plate 10, Fig. 3.

Shell of moderate size (40-45 mm.), rather slender, with narrowly conic spire (93° - 100°). Carinate at shoulder which is not the greatest width of the shell. Below the carina the body-whorl swells slightly and then rapidly contracts below with straight to very slightly concave outlines. Above the carina, which is a strong rounded fold, the spire whorls are sculptured with 6-8 crisp threads between suture and carina. Body-whorl below the carina sculptured with about 30 weak but distinct spiral threads, four of which are crowded upon the slight fasciole. Lower threads stronger and irregularly weakly beaded. The whole shell covered with a thin buff vertically striated epidermis produced into numerous short tufts along the spiral threads. Colour pattern of three irregular zones of reddish-brown with darker blotches on a ground of mauve-pink. Ground colour of the body-whorl formed into two narrow interzone bands above and a broad area below. Spire tessellated with dark reddish-brown on a variegated ground of mauve-pink, diffused with light reddish-brown. Interior of aperture mauve-pink.

Height, 43.6 mm.; diameter, 21.0 mm. Spire 95° (Holotype).

Locality: Galathea St. 674, $29^{\circ} 15' S.$; $177^{\circ} 57' W.$, off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

Conus (Dauciconus) planorbis Born, 1780.

Height, 61.0 mm.; diameter, 33.0 mm. Spire 125° (St. 674).

Locality: Galathea St. 674, $29^{\circ} 15' S.$; $177^{\circ} 57' W.$, off Raoul Island, Kermadecs, 75-85 metres, 3:3:1952.

The species is known from Queensland, Fiji, New Caledonia and the Philippines.

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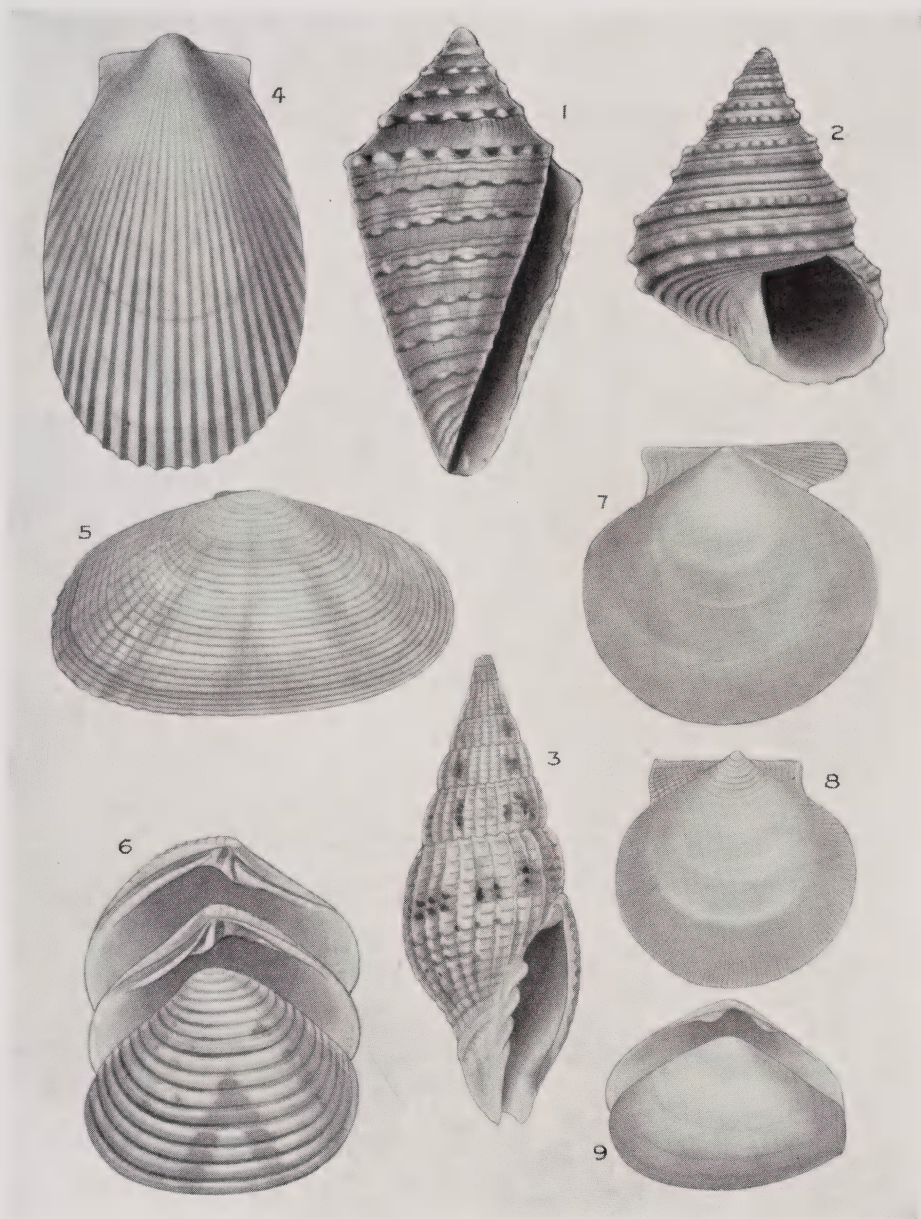


Fig. 1 *Conus (Kermasprella) raoulensis* n. subgen. and n. sp. Holotype. 18 mm. x 9.4 mm.

Fig. 2. *Fautor consobrinus* n. sp. Holotype. 6.3 mm. x 5 mm.

Fig. 3. *Mitropifex iredalei* n. sp. Holotype. 14.7 mm. x 5.4 mm.

Fig. 4. *Limatula oliveri* n. sp. Holotype. 7.0 mm. x 4.2 mm.

Fig. 5. *Asaphis nana* n. sp. Holotype. 5.6 mm. x 9.8 mm.

Fig. 6. *Salaputium iredalei* n. sp. Holotype. 5 mm. x 6 mm.

Figs. 7, 8. *Chlamydella favus lemchei* n. subsp. (7, right valve, 5.9 mm. x 5.5 mm.) (8, left valve, Holotype, 4.5 mm. x 4.5 mm.).

Fig. 9. *Austronacra raoulensis* n. sp. Holotype. 3.75 mm. x 2.6 mm.



Figs. 1, 2. *Pecten raoulensis* n. sp. Holotype. 83 mm. x. 76 mm. x 29 mm.

Fig. 3. *Conus (Dauciconus) bruuni* n. sp. Holotype 43.6 mm. x 21 mm.

Fig. 4. *Kermadysmca galatheae* n. gen. and n. sp. Holotype. 21 mm. x 44 mm.

Fig. 5. *Ravitrona tomlini kermadecensis* n. subsp. Holotype, 24 mm. x 15 mm.

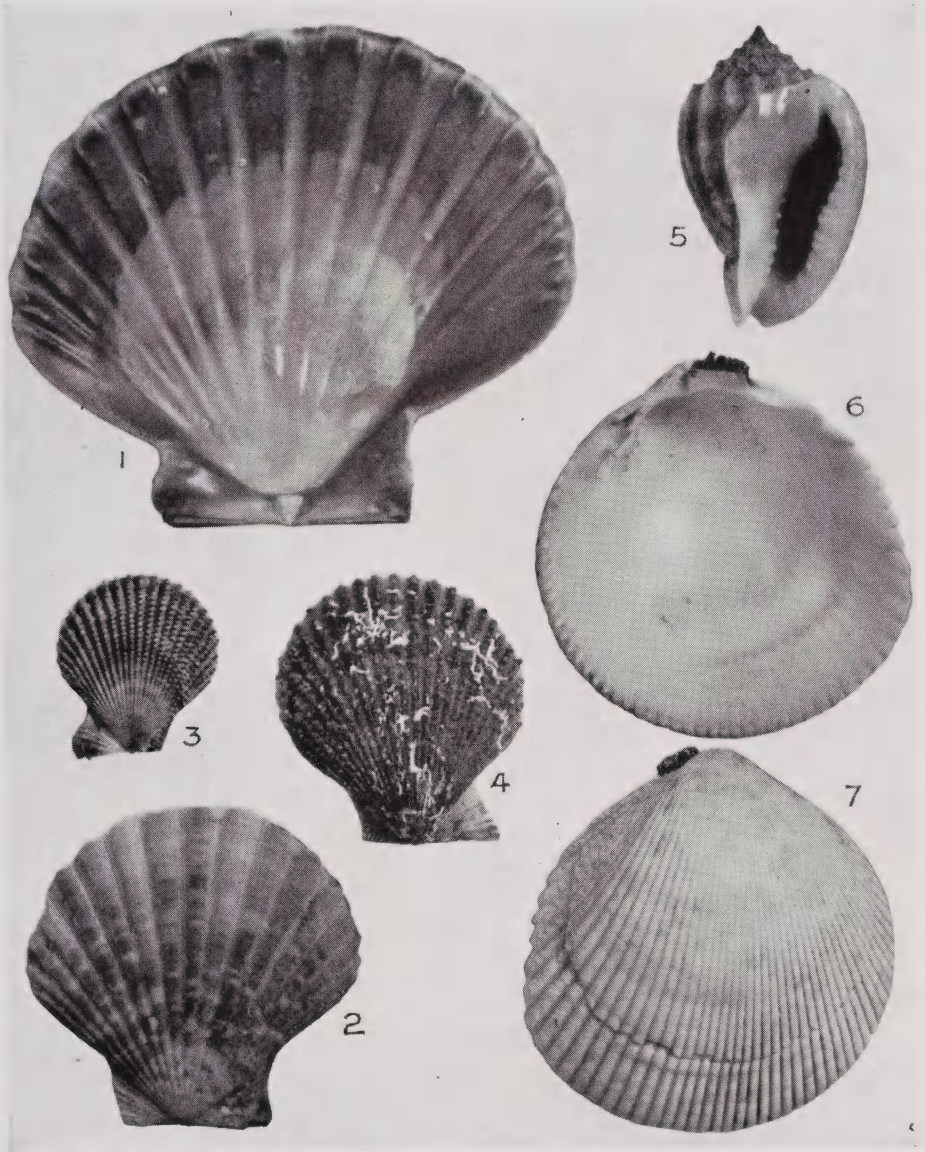


Fig. 1. *Aequipecten (Corymbichlamys) iredalei* n. sp. Paratype. 72 mm. x 82.5 mm.
 Fig. 2. *Aequipecten (Corymbichlamys) iredalei* n. sp. Holotype. 33 mm. x 35 mm.
 Fig. 3. *Chlamys (Mimachlamys) asperrimoides* n. sp. Holotype (Norfolk Island). 20.2 mm. x 18.0 mm.
 Fig. 4. *Chlamys (Mimachlamys) asperrimoides* n. sp. (Galathea St. 674). 30.6 mm. x 27.15 mm.
 Fig. 5. *Oniscidia bruuni* n. sp. Holotype, 32.5 mm. x 21 mm.
 Figs. 6, 7. *Trachycardium (Vasticardium) sorenseni* n. sp. Holotype. 42.25 mm. x 40.5 mm.